



INTERNAL USE ONLY

New Products

HMC

NHM/NHP series

February 2014
Doosan Infracore
Machine Tools BG



B-2. Horizontal MC

Pallet size (mm)	Tool taper #40		Tool taper #50			
	HC series	HP series	HP series	NHP series	HM series	NHM series
						
400x400	HC 400	HP 4000 II				
500x500	HC 500	HP 5100 II	HP 5500	NHP 5500	HM 5000	NHM 5000
630x630			HP 6300	NHP 6300	HM 6300	NHM 6300
800x800				NHP 8000	HM 8000	NHM 8000
1000x1000			+ NHP8000/5AX (draft)		HM 1000	
1250x1250					HM 1250	

LM type compact model

- Pallet size : 400~500mm
- Belt type spindle
- High rigid Roller type LM guide

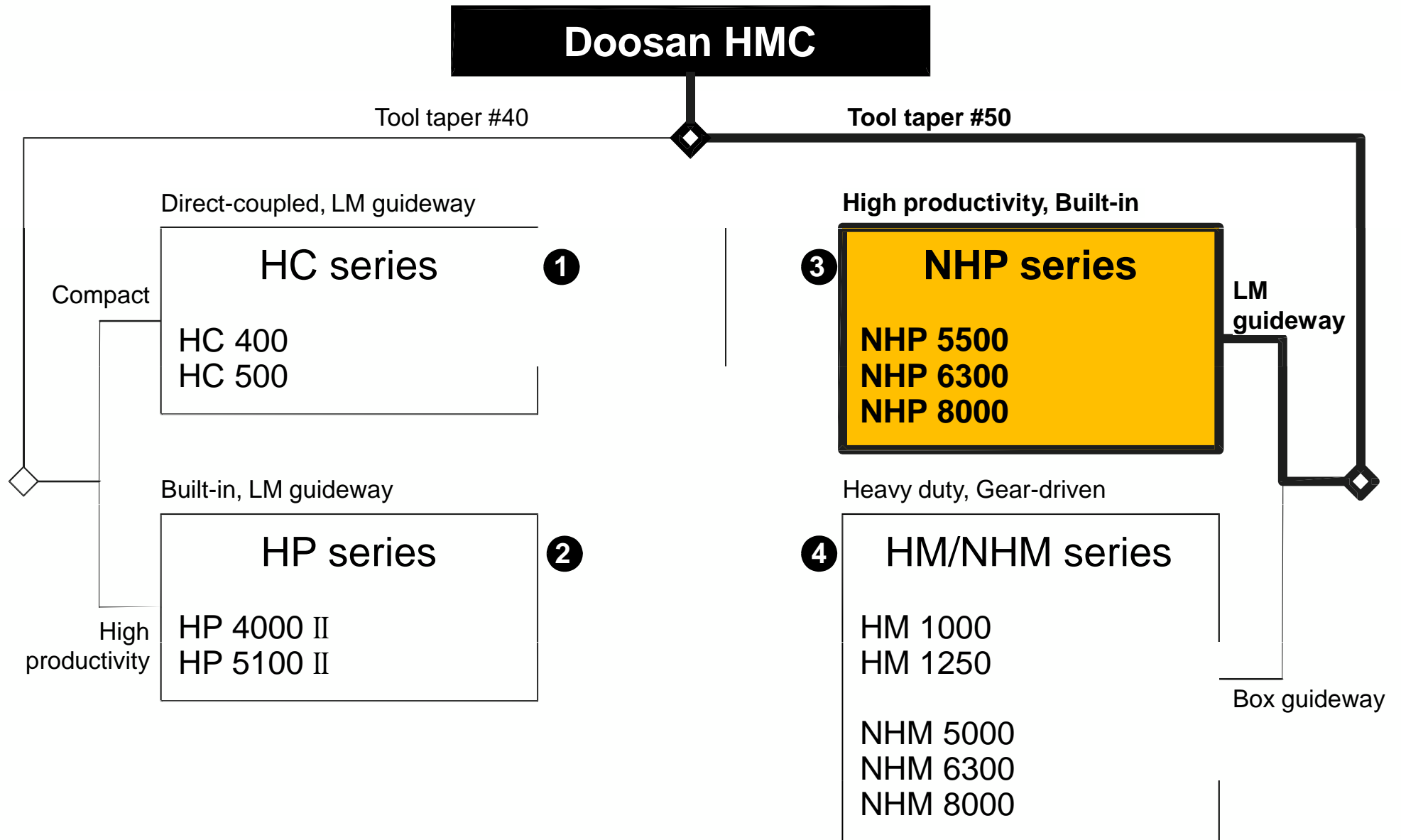
High speed for Productivity

- Pallet size : 400~800mm, 800mm
- Rapid traverse : 60m/min(#40/ #50), 50m/min(NHP8000)
- Roller type LM guide
- Built-in spindle (10~14k rpm Std. 6K/20k rpm Opt.)

Heavy duty cutting

- Pallet size : 500~1,250 mm
- 2step(NHM) Gear box #50 Taper spindle & Box-Guideway

Concept...



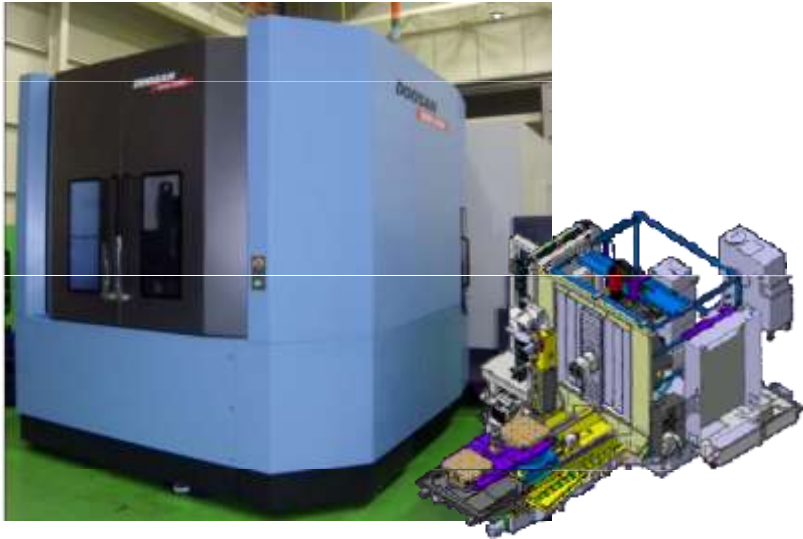
NHP series



Pallet size (mm)	Tool taper	Compact	High productivity	Heavy duty
400	#40	HC 400	HP 4000 II	
500	#40	HC 500	HP 5100 II	
	#50		NHP 5500	NHM 5000
630	#50		NHP 6300	
			NHP 6300S	NHM 6300
800	#50		NHP 8000	NHM 8000
1000	#50			HM 1000
1250	#50			HM 1250

NHP5500 _ CONCEPT & FEATURES

High Productivity hor. machining center



Major specification

- Stroke (X/Y/Z) : 800/750/850mm
- Rapid Traverse (X/Y/Z) : 60/60/60 m/min
- Max. spindle speed : 10,000 rpm
- Max. tool length : 530 mm (HSK 600mm)
- Max. tool diameter : Ø320 mm
- ATC time (T-T-T) : 2.0/3.5 sec.
- Max. workpiece size : Ø850 mm x 1,100 mm
- APC time : 8.5 sec.

Application area

- Automobile, Aerospace
- medical appliances
- Mold & Die

Typical workpiece

- Automobile parts
- IT industry parts, Medical equipment p



Main features

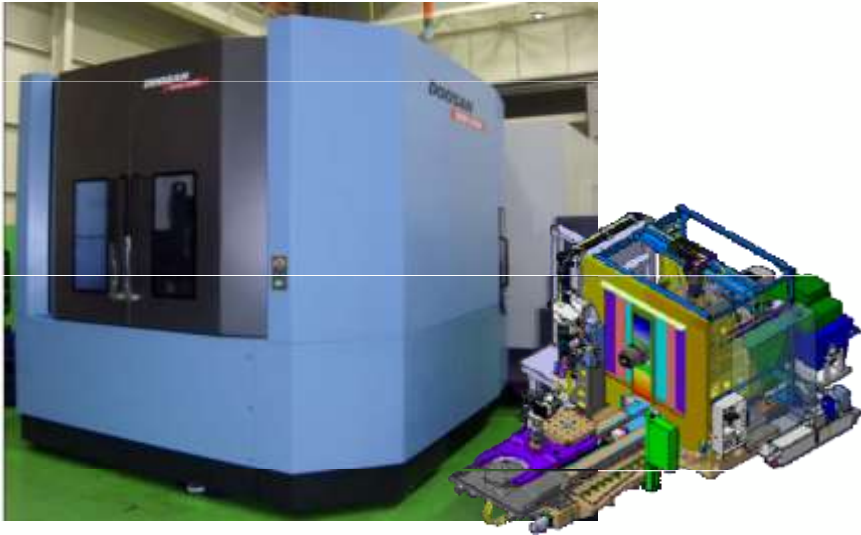
- High speed & high rigidity built-in spindle
- High rigid bed of one body type
- ATC & Magazine is driven by the servo motor
- APC is rotated by the servo motor
- Ball-screw nut-cooling is standard. And shaft cooling of ball-screw is option.
- New splash guard & OP box upgraded for user's convenience

Main competitor

- Mori-seiki, Mazak, Makino, Okuma

NHP6300 _ CONCEPT & FEATURES

Heavy duty horizontal machining center



Major specification

- Stroke (X/Y/Z) : 1,050/850/1,000mm
- Rapid Traverse (X/Y/Z) : 60/60/60 m/min
- Max. spindle speed : 10,000 rpm
- Max. tool length : 630 mm (HSK 700mm)
- Max. tool diameter : Ø320 mm
- ATC time (T-T-T) : 2.0/3.5 sec.
- Max. workpiece size : Ø1,050 mm x 1,350 mm
- APC time : 12.0 sec.

Application area

- Automobile, Aerospace
- medical appliances
- Mold & Die

Typical workpiece

- Automobile parts
- IT industry parts, Medical equipment parts



Main features

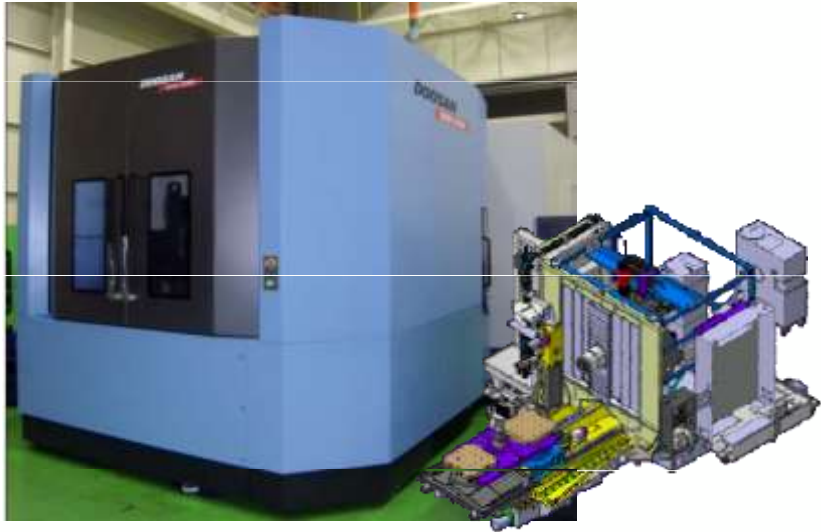
- High speed & high rigidity built-in spindle
- High rigid bed of one body type
- ATC & Magazine is driven by the servo motor
- APC is rotated by the servo motor
- Ball-screw nut-cooling is standard. And shaft cooling of ball-screw is option.
- New splash guard & OP box upgraded for user's convenience

Main competitor

- Mori-seiki, Mazak, Makino, Okuma, Hyundai-WIA

NHP8000 _ CONCEPT & FEATURES

High Productivity hor. machining center



Major specification

- Stroke (X/Y/Z) : 1400/1200/1370mm
- Rapid Traverse (X/Y/Z) : 50/50/50 m/min
- Max. spindle speed : 10,000 rpm
- Max. tool length : BT/DIN $\hat{=}$ 630 (800) mm
HSK $\hat{=}$ 700 (870) mm
- Max. tool diameter : \varnothing 320 mm
- ATC time (T-T-T) : 2.0/3.5 sec.
- Max. workpiece size : \varnothing 1450 mm x 1,550 mm
- APC time : 16 sec.

Application area

- Automobile, Aerospace
- medical appliances
- Mold & Die

Typical workpiece

- Automobile parts
- IT industry parts, Medical equipment p



Main features

- High speed & high rigidity built-in spindle
- High rigid bed of one body type
- ATC & Magazine is driven by the servo motor
- APC is rotated by the servo motor
- Ball-screw nut-cooling is standard. And shaft cooling of ball-screw is option.
- New splash guard & OP box upgraded for user's convenience

Main competitor

- Mori-seiki, Mazak, Makino, Okuma

Sales points...



1 Largest Capacity

2 Strongest Performance

3 More Convenience

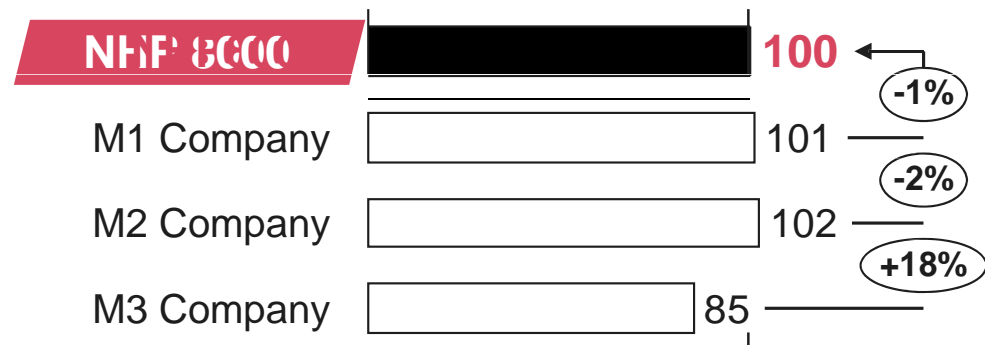
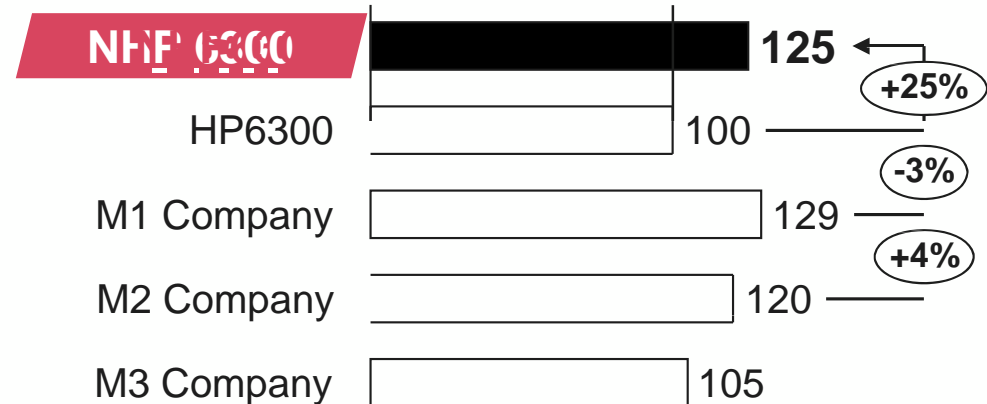
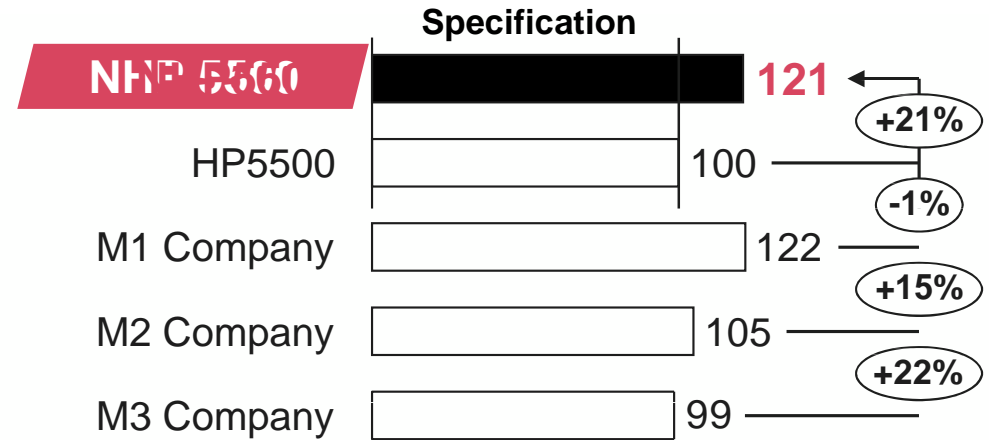
4 Higher Reliability

Sales point: The Largest Capacity

The Largest Capacity

World Top Class Specification

- f Axes
- f Spindle
- f Auto Pallet Change
- f Auto Tool Changer



Sales point: The Strongest Performance

The machining performance of NHP series is 8% more productive than the previous HP series

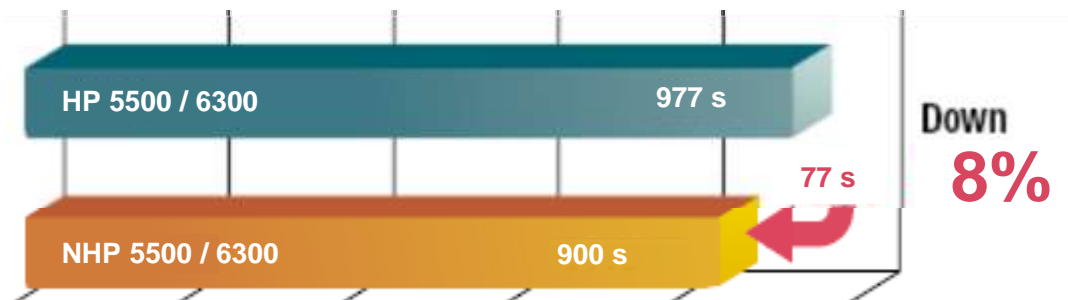
The Strongest Performance

• Productivity

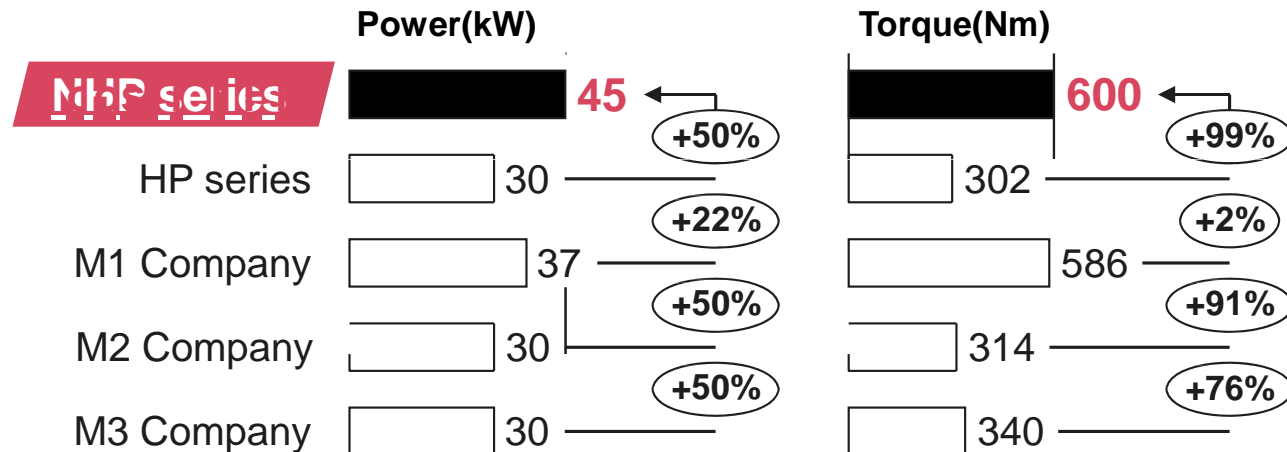
- Automotive part: Cylinder block
- Casting iron
- 20 tools used



- Cycle time(sec.)



• Spindle Power & Torque

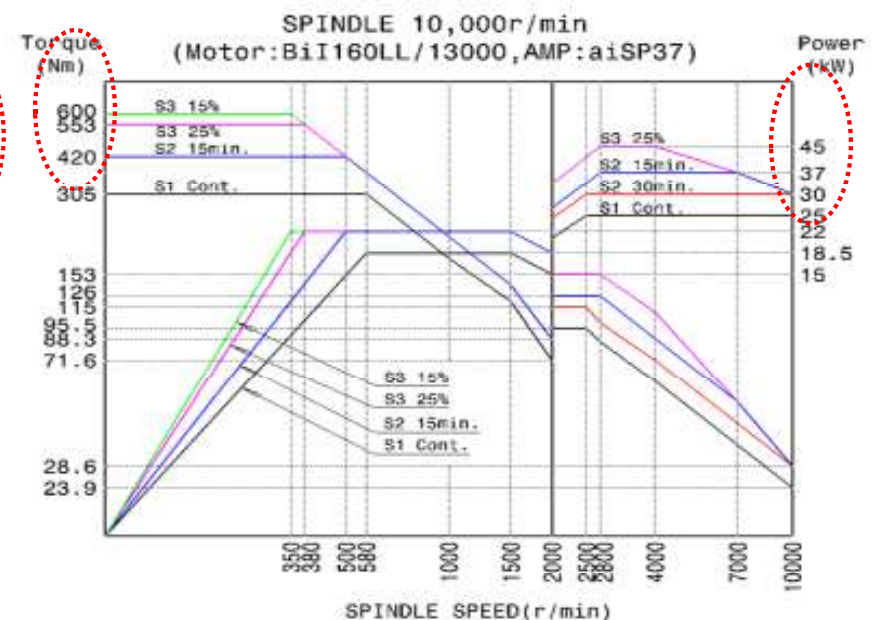
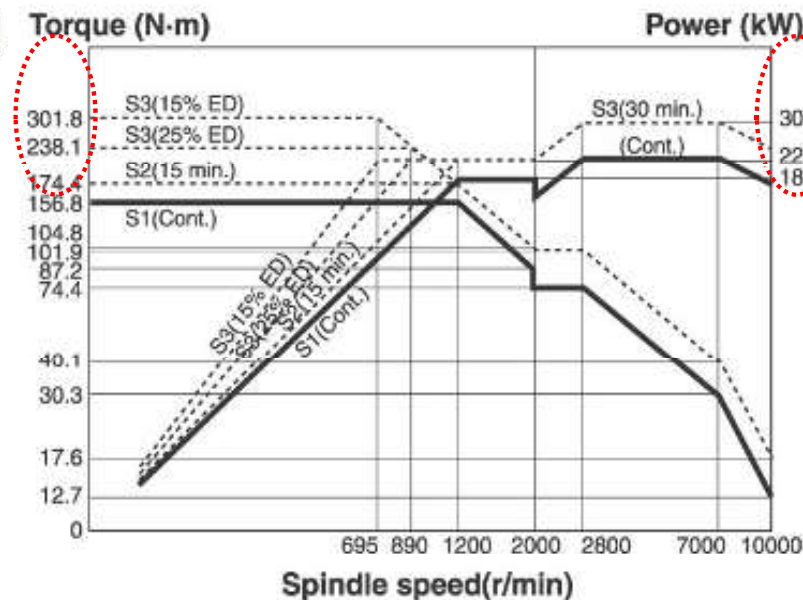


Sales point: The Strongest Performance_Heavy duty cutting

Max. Chip removal rate Comparison

Material	HP5500/6300 (Spindle Motor Power 18.5/30kW)		NHP5500/NHP6300/NHP8000 (Spindle Motor Power 25/45kW)	
	Facemilling Chip disposal rate	Performance ratio	Facemilling Chip disposal rate	Performance ratio
Aluminum	3,120 cm ³ /min	100%	5,200 cm ³ /min	166.6%

High
Performance



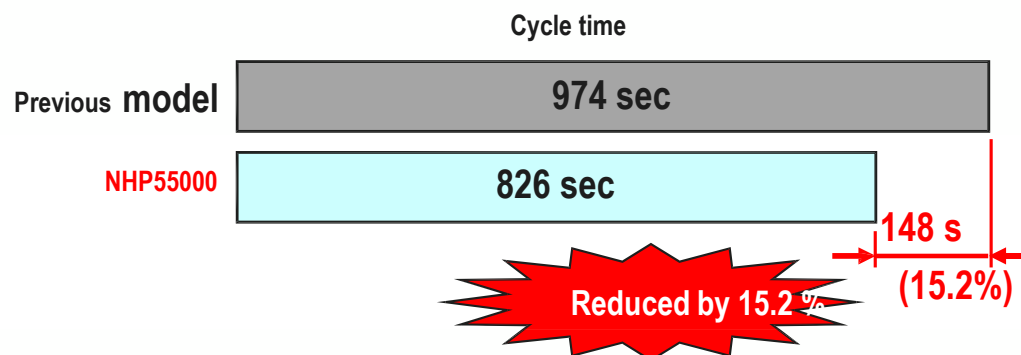
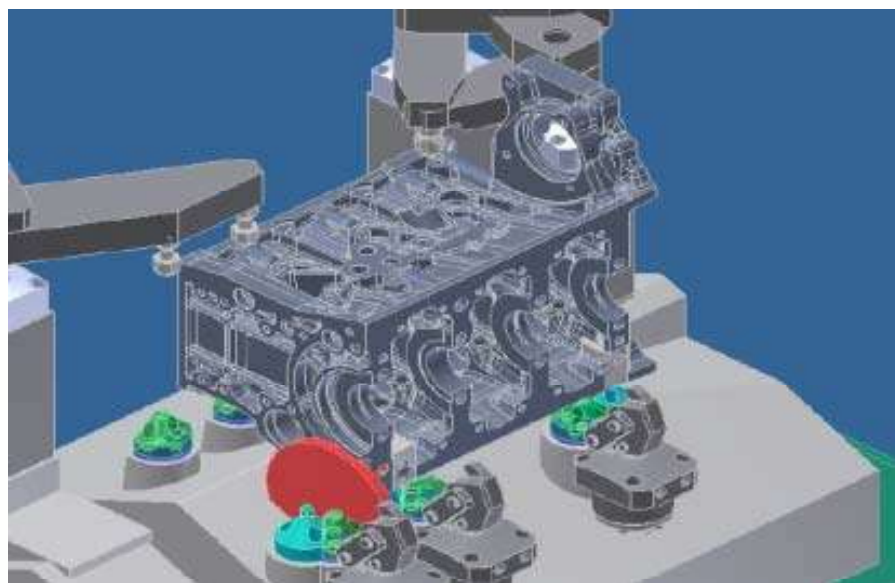
Sales point: The Strongest Performance_Productivity

- Part Name : Cylinder Block
- Material : Casting iron
- Number of used tool : 20 tools

High
Performance

Productivity Compared with MAKINO

No	TOOL DIA (mm)	TOOL DESCRIPTION	MAKINO	Doosan
			a71	NHP5500
1	ø160	ZEROMILL	112	114
2	ø125	ZEROMILL	21	22
3	ø100	SHOULDERMILL	27	27
4	ø160	FINISH MILL	42	45
5	ø160	FINISH MILL	27	22
6	ø14.1	SC DRILL	14	16
7	ø10.3	STEP DRILL	20	27
8	ø5	SC DRILL	15	13
9	ø10.3	SC DRILL	52	53
10	ø6.8	SC DRILL	67	68
11	ø20x45	CHAMFER	65	67
12	M8x1.25	TAP	154	141
13	M12x1.75	TAP	97	92
14	ø17.2	STEP DRILL	13	14
15	1/2"	NPFT TAP	13	14
16	ø60.08	BORE TOOL	13	13
17	ø14.28	ENDMILL	22	24
18	ø16.68	REAMER	13	16
19	M6x1	TAP	27	21
20	ø86	ROUGH BORE	23	17
TOTAL			837 sec	826 sec



Sales point: More convenience

More Convenience

- New HMC ATC Screen panel operation



- no noise Semi-permanent Cyclone system filter of T-S-C Unit

- Chip disposal
 - Rear type chip Conveyor adaptive to chip disposal for automatic system
 - Larger coolant tank

- Machine flushing to remove chip on the spindle



- An easy-to-use operation panel
 - Fixed & Swiveling
 - Membrain type button



- New H-MC Customize Package I customized to provide user friendly functions and control the magazine for tool and pallet

- Foot plate for safety in working area



- Door unlocking device



- Oil skimmer
 - Opt. & Std.



- Utility kit in one box



Sales point: Higher Reliability

Higher Reliability

- Servo driven Tool magazine to reduce ATC time and improve reliability
- Durability test
 - M06 total 600,000 times

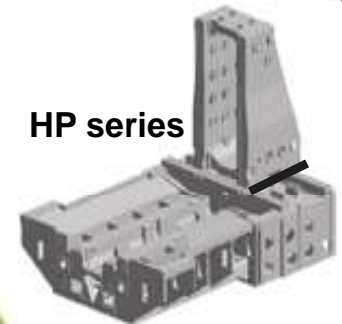


- Common units in NHP and NHM series
 - Spindle, Table, APC, ATC, Coolant tank, Total piping
 - Tool magazine : 90/120/150/Matrix type

- Spindle bearing inner dia. : $\Phi 90 \hat{=} \Phi 100$ t improve rigidity



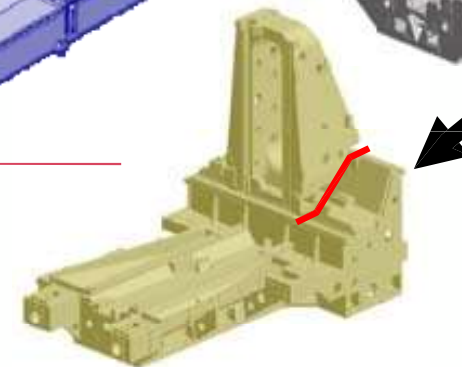
HP series



- Servo driven APC to reduce APC time and improve reliability
- Durability test
 - Table: total 120,000 times
 - APC : total 60,000times



- Coolant Leakage Free Bed



- X-axis Step-guide type
- Stiff bed for table & column in a body
- Column for rigidity

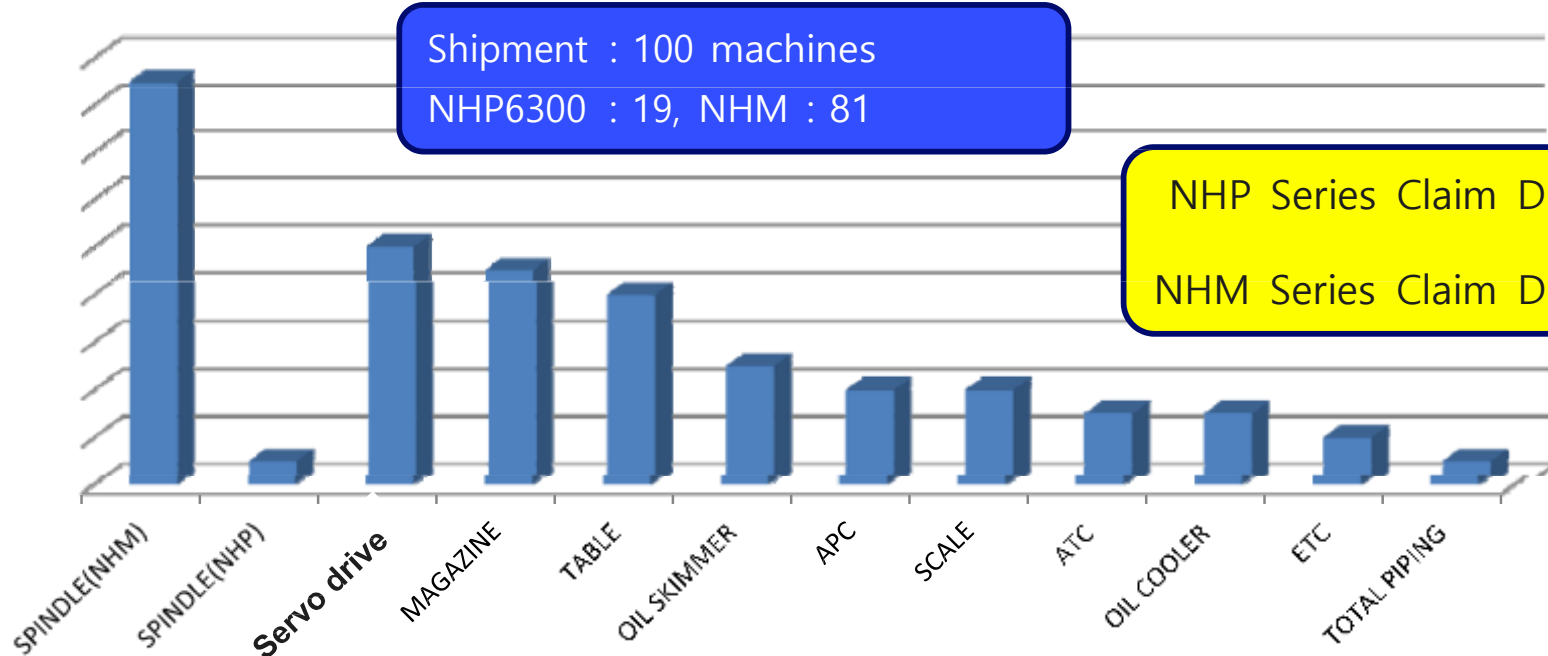


- Ball screw nut with cooling jacket (std.)
- Shaft cooling (opt.)

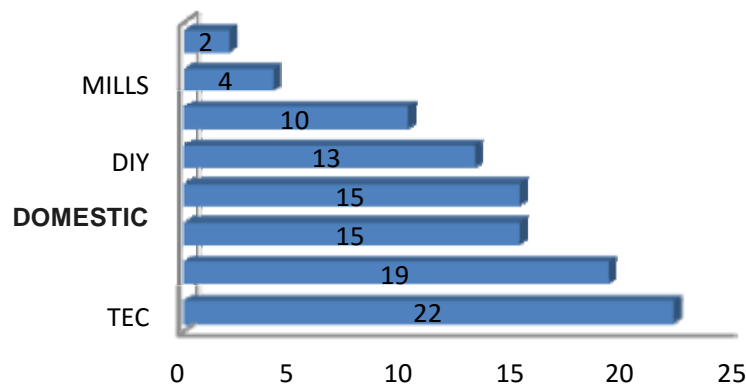
What about claim based quality improvement of NHM/NHP series

High Quality

Analysis for field claim by each unit (2011 ~ Mar. 2013) _data from ERP



Shipment to ~



Yr 2009 HP Series DPU : 2.1

Yr 2009 HM Series DPU : 4.4

Common units in NHP and NHM series

ITEM			NHM5000	NHP5500	NHM6300	NHP6300	NHM8000	NHP8000	Remark
SPINDLE	GEAR BOX	6,000 rpm	⦿		⦿		⦿		
		8,000 rpm	⦿		⦿		⦿		
	BUILT-IN	10,000 rpm		✱		✱		✱	
		15,000 rpm		✱		✱		✱	
TABLE	INDEX		✱	✱	⬠	⬠	⦿	⦿	The guide-way is only different.
	ROTARY		✱	✱	⬠	⬠	⦿	⦿	The guide-way is only different.
ATC			●	●	●	●	●	●	
MAGAZINE	40/60 TOOLS			✱		✱		✱	Pot type Magazine
	60 TOOLS		⦿		⦿		⦿		Chain type Magazine
	90/120/150 TOOLS		●	●	●	●	●	●	Chain type Magazine
	196/256/316/376 TOOLS		●	●	●	●	●	●	Matrix type Magazine
APC			✱	✱	⬠	⬠	⦿	⦿	
PALLET			✱	✱	⬠	⬠	⦿	⦿	
COOLANT TANK			✱	✱	✱	✱	✱	✱	
SPLASH GUARD			✱	✱	⬠	⬠	⦿	✱	
OP BOX, ELECTRIC BOX			●	●	●	●	●	●	

NHP 5500

[] : option

Features		unit	DOOSAN				MAZAK				MORI-SEIKI				MAKINO			
			NHP5500		121%	HP5500		100%	Nexus 6000II		122%	NHX5500		105%	a71		99%	
Axes	Guideway		Linear Motion		111%	Linear Motion		100%	Linear Motion		111%	Linear Motion		111%	Linear Motion		102%	
	Travel X axis	mm(inch)	800(31.5)	100%		800(31.5)	100%		800	100%		800	100%		730	91%		
	Travel Y axis	mm(inch)	750(29.5)	107%		700(27.6)	100%		800	114%		800	114%		730	104%		
	Travel Z axis	mm(inch)	850(33.5)	113%		750(29.5)	100%		800	107%		800	107%		800	107%		
	Rapid traverse (X/Y/Z)	m/min(ipm)	60/60/60 (2362.2/2362.2/2362.2)	125%		48/48/48 (1889.8/1889.8/1889.8)	100%		60/60/60	125%		60/60/60	125%		50/50/50	104%		
	Pallet center to spindle gage line	mm(inch)	100-950 (3.9 - 37.4)			150-900 (5.9-35.4)			150-950			70-950			50-850			
APC	Pallet size	mm(inch)	500x500(19.7 x 19.7)		110%	500x500(19.7 x 19.7)		100%	500x500		121%	500x500		100%	500x500		89%	
	Max. Workpiece(DxH)	mm(inch)	850x1100 (33.5 x 43.3)	131%		800 x 950 (31.5 x 37.4)	100%		900x1000	133%		800x1100	116%		800x1000	105%		
	Max. Allowable weight	kgf(ib)	800(31.5)	100%		800(31.5)	100%		1000	125%		500 [700]	63%		500 [700]	63%		
	Pallet change time	sec.	8.5	100%		8.5	100%		9	106%		7	121%		8.5 [10.0]	100%		
Spindle	Spindle motor type		Built-in		150%	Built-in		100%	Built-in		139%	Built-in		95%	Built-in		104%	
	Speed	r/min	10000 [6000, 15000]	100%		10000 [6000]	100%		10000 [7000]	100%		8000 [15000]	80%		10000	100%		
	Motor power	kW(Hp)	45/25 [37/25, 37/30] (33.5/18.6 [27.6/18.6, 27.6/22.3])	150%		30/22 [30/22] (22.4/16.4 [22.4/16.4])	100%		37/30	123%		30/22 [40/25, 30/25]	100%		30/25	100%		
	Max. Torque	Nm(ft.lb)	600[809, 398] (442.9) [597, 293.7])	199%		301.8 [599.8] (222.4 [443.1])	100%		586	194%		314	104%		340/400	113%		
ATC	Type of spindle taper		No.50		114%	No.50		100%	No.50		117%	No.50		115%	No.50		103%	
	Tool storage capa.	ea	40 [60/90/120/150/ 196/256/317/376]	100%		40 [60/90/120/196]	100%		43 [60/80/120/160/ 240/330]	108%		Drum type 40 [60, 100, 120, 180, 240, 330]	100%		40 [60/97/137/186/ 242/300]	100%		
	Max.Tools diameter	mm(inch)	130/320 (5.1/12.6)	104%		125/250(4.9/9.8)	100%		125/250	100%		110/300	88%		120/300	96%		
	Max. Tool length	mm(inch)	530(20.8)(HSK 600)	118%		450(17.7)	100%		500	111%		550	122%		450	100%		
	Max. Tool weight	kgf(ib)	30(66.1)	150%		20(44.1)	100%		30	150%		30	150%		20	100%		
	Tool change time(T-T-T)	sec.	2	100%		2	100%		-	NA		4.0(CTC)	NA		1.7	118%		

NHP 6300

[]: option

Features		unit	DOOSAN				MAZAK		MORI-SEIKI		MAKINO	
			NHP6300	125%	HP6300	100%	HCN6800-II	129%	NHX6300	120%	a81	105%
Axes	Guideway		Linear Motion		Linear Motion		Linear Motion		Linear Motion		Linear Motion	
	Travel X axis	mm(inch)	1050(41.3)	105%	1000(37.4)	100%	1050	105%	1050	105%	900	90%
	Travel Y axis	mm(inch)	900(35.4)	106%	850(33.5)	100%	900	106%	900	106%	800	94%
	Travel Z axis	mm(inch)	1000(37.4)	118%	850(33.5)	100%	980	115%	1030	121%	900	106%
	Rapid traverse (X/Y/Z)	m/min(ipm)	60/60/60 (2362.2/2362.2/2362.2)	125%	48/48/48 (1889.8/1889.8/1889.8)	100%	60/60/60	125%	60/60/60	125%	60/60/60	125%
	Pallet center to spindle gage line	mm(inch)	100-1100(3.9-43.3)		150-1000 (5.6-37.4)		100-1100		50-1080		50-850	
APC	Pallet size	mm(inch)	630x630(24.8 x 24.8)		630x630 (24.8 x 24.8)		630x630		630x630		630x630	
	Max. Workpiece(DxH)	mm(inch)	1050x1350 (41.3 x 53.1)	129%	1000x1150 (37.4 x 45.3)	100%	1050x1350	129%	1050x1300	125%	1000x1300	113%
	Max. Allowable weight	kgf(ib)	1500(3306.9)	125%	1200(2645.5)	100%	1500	125%	1500	125%	1200	100%
	Pallet change time	sec.	12	100%	12	100%	9	133%	7	171%	8.5 [10.0]	141%
Spindle	Spindle motor type		Built-in		Built-in		Built-in		Built-in		Built-in	
	Speed	r/min	10000 [6000, 15000]	100%	10000 [6000]	100%	10000 [7000]	100%	8000 [15000/8000]	80%	10000	100%
	Motor power	kW(Hp)	45/25 [37/25, 37/30] (33.5/18.6 [27.6/18.6, 27.6/22.3])	150%	30/22 [30/22] (22.4/16.4 [22.4/16.4])	100%	44.4/30[26/22]	148%	30/25 [30/25, 40/25]	100%	22/18.5[37/30]	73%
	Max. Torque	Nm(ft.lb)	600[809, 398] (442.9[597, 293.7])	199%	301.8 (599.8)	100%	586	194%	314	104%	340/400	113%
ATC	Type of spindle taper hole		No.50		No.50		No.50		No.50		No.50	
	Tool storage capa.	ea	40 [60/90/120/150/ 196/256/317/376]	100%	40 (60/90/120/196)	100%	43 [80/120/160/Matrix]	108%	60 [100, 120, 180,240,330]	150%	40 [60/132/Matrix]	100%
	Max.Tools diameter	mm(inch)	130/320 (5.1/12.6)	104%	125/250(4.9/9.8)	100%	135/260	108%	110/320	88%	120/300	96%
	Max. Tool length	mm(inch)	630(24.8)[HSK 700]	140%	450(17.7)	100%	630	140%	630	140%	450	100%
	Max. Tool weight	kgf(ib)	30(66.1)	150%	20(44.1)	100%	30	150%	30	150%	20	100%
	Tool change time(T-T)	sec.	2	100%	2	100%	4.2(CTC)	NA	4.8(CTC)	NA	1.7	118%

NHP 8000

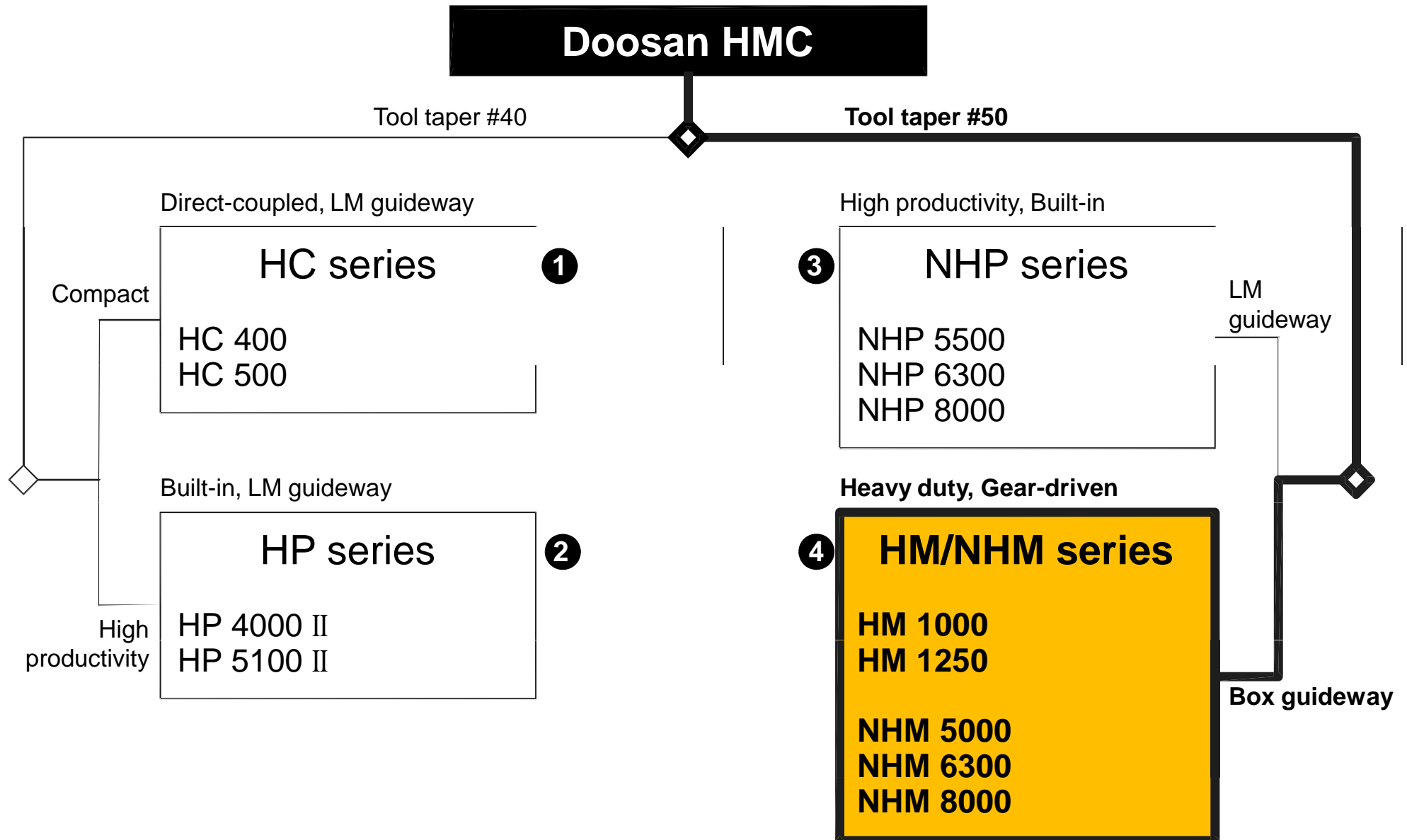
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Features		unit	DOOSAN		MAZAK		MORI-SEIKI		MAKINO		OKUMA	
			NHP8000	100%	Nexus 8800II	101%	NHX8000	102%	A99E	85%	MB-8000H	89%
Axes	Guideway		Linear Motion		Linear Motion		Linear Motion		Linear Motion		Linear Motion	
	Travel X axis	mm(inch)	1400(55.1)	100%	1400	100%	1400	100%	1250	89%	1300	93%
	Travel Y axis	mm(inch)	1200(47.2)	100%	1200	100%	1200	100%	1100	92%	1100	92%
	Travel Z axis	mm(inch)	1370(53.9)	100%	1325	97%	1350	99%	1250	91%	1250	91%
	Rapid traverse (X/Y/Z)	m/min(ipm)	50/50/50 (1968.5/1968.5/1968.5)	100%	60/60/60	120%	50/50/50	100%	50/50/50	100%	50/50/50	100%
	Pallet center to spindle gage line	mm(inch)	150-1500 (5.9-59.0)		100-1425		70-950		70-1320		100-1350	
APC	Pallet size	mm(inch)	800x800 (31.5 x 31.5)		800x800		800x800		800x800		800x800	
	Max. Workpiece(DxH)	mm(inch)	1450x1550 (57 x 61)	100%	1450x1450	94%	1450x1450	94%	1450x1450	94%	1300 x 1450	75%
	Max. Allowable weight	kgf(ib)	2000(4409.2)	100%	2200	110%	2200[3000]	110%	2000[3000]	100%	2000	100%
	Pallet change time	sec.	16	100%	13	123%	7	229%	23	70%	-	
Spindle	Spindle motor type		Built-in		Built-in		Built-in		Built-in		Built-in	
	Speed	r/min	10000 [6000, 15000]	100%	10000	100%	10000[15000, 8000, 6000]	100%	10000[18000]	100%	6000[12000, 6000 HIGH POWER]	60%
	Motor power	kW(Hp)	45/25 [37/25, 37/30] (33.5/18.6 [27.6/18.6, 27.6/22.3])	100%	37/30	82%	30/25	67%	30/25	67%	30/22	67%
	Max. Torque	Nm(ft.lb)	600[809, 398] (442.9 [597, 293.7])	100%	586	98%	314	52%	239/420	40%	606	101%
ATC	Type of spindle taper hole		No.50		No.50		No.50[HSK-A100]		No.50		No.50 (HSK-A100)	
	Tool storage capa.	ea	40 [60/90/120/150/ 196/256/317/376]	100%	60 [80/120/160/180/ 240/330]	100%	60[80/100/120/180/ 240/330]	100%	40 [60/97/137/186/ 242/300]	67%	40 [60, 81 ~ 285, 320, 400]	100%
	Max.Tools diameter	mm(inch)	130/320 (5.1/12.6)	100%	125/250	96%	110/300	85%	125/300	96%	140/240[315]	108%
	Max. Tool length	mm(inch)	630[800] (24.8[31.5])	100%	630[800]	100%	550	87%	600	95%	600[700]	95%
	Max. Tool weight	kgf(ib)	30(66.1)	100%	30	100%	30	100%	20	67%	25[30]	83%
	Tool change time(T-T-T)	sec.	2	100%	-	NA	4.0(CTC)	NA	1.7	118%	2	100%

B-2. Horizontal MC

Pallet size (mm)	Tool taper #40		Tool taper #50			
	HC series	HP series	HP series	NHP series	HM series	NHM series
						
400x400	HC 400	HP 4000 II				
500x500	HC 500	HP 5100 II	HP 5500	NHP 5500	HM 5000	NHM 5000
630x630			HP 6300	NHP 6300	HM 6300	NHM 6300
800x800				NHP 8000	HM 8000	NHM 8000
1000x1000					HM 1000	
1250x1250					HM 1250	

Concept...



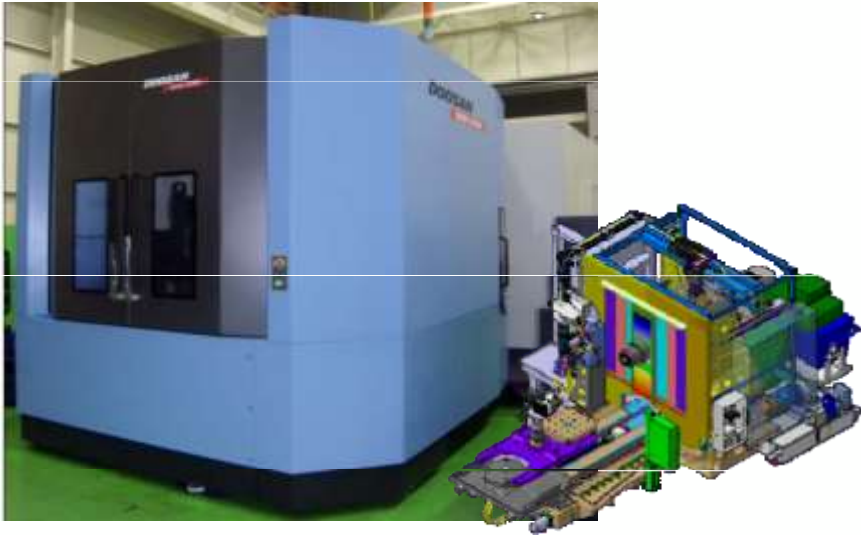
HM/NHM series



Pallet size (mm)	Tool taper	Compact	High productivity	Heavy duty
400	#40	HC 400	HP 4000 II	
500	#40	HC 500	HP 5100 II	
	#50		NHP 5500	NHM 5000
630	#50		NHP 6300	
			NHP 6300S	NHM 6300
800	#50		NHP 8000	NHM 8000
1000	#50			HM 1000
1250	#50			HM 1250

NHM6300 - OVER VIEW

Heavy duty horizontal machining center



Major specification

- Stroke (X/Y/Z) : 1,050/850/1,000mm
- Rapid Traverse (X/Y/Z) : 30/30/30 m/min
- Max. spindle speed : 6,000rpm
- Max. tool length : 630 mm (HSK 700mm)
- Max. tool diameter : Ø320 mm
- ATC time (T-T-T) : 2.0/3.5 sec.
- Max. workpiece size : Ø1,050 mm x 1,350 mm
- APC time : 12.0 sec.

Sample items

- Engine block, Shipbuilding parts
- Hydraulic components , Tough material



Application area

- Automobile, Construction equipment
- Industrial machinery and equipment
- Hard-to-Cut Material

Main features

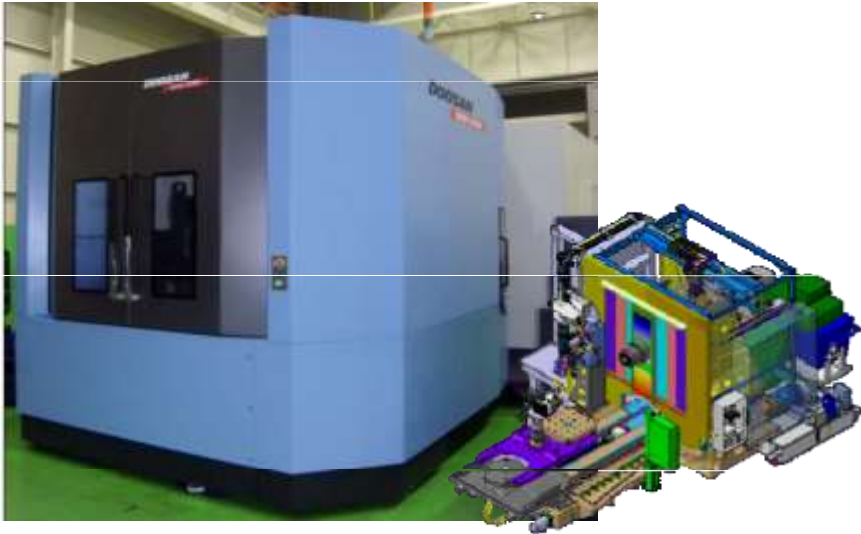
- High speed & high rigidity Gear-box spindle
- High rigid bed of one body type
- ATC & Magazine is driven by the servo motor
- APC is rotated by the servo motor
- Ball-screw nut-cooling is standard. And shaft cooling of ball-screw is option.
- New splash guard & OP box upgraded for user's convenience

Main competitor

- Hyundai-WIA, Mori-seiki, Toyoda

NHM 8000 - OVER VIEW

Heavy duty horizontal machining center



Major specification

- Stroke (X/Y/Z) : 1,400/1,050/1,200mm
- Rapid Traverse (X/Y/Z) : 24/24/24m/min
- Max. spindle speed : 6,000rpm
- Max. tool length : 630 mm (HSK 700mm)
- Max. tool diameter : Ø320 mm
- ATC time (T-T-T) : 2.0/3.5 sec.
- Max. workpiece size : Ø1,450 mm x 1,550 mm
- APC time : 12.0 sec.

Typical workpiece

- Engine block, Shipbuilding parts
- Hydraulic components , Tough material



Application area

- Automobile, Construction equipment
- Industrial machinery and equipment
- Hard-to-Cut Material

Main features

- High speed & high rigidity Gear-box spindle
- High rigid bed of one body type
- ATC & Magazine is driven by the servo motor
- APC is rotated by the servo motor
- Ball-screw nut-cooling is standard. And shaft cooling of ball-screw is option.
- New splash guard & OP box upgraded for user's convenience

Main competitor

- Hyundai-WIA, Mori-seiki, Toyoda

HM vs NHM



1. Bed Structure

- Separated type Bed Æ One body Bed

2. Axis type for Z-axis

- Column moving Æ Table Moving

3. Direction of chip disposal

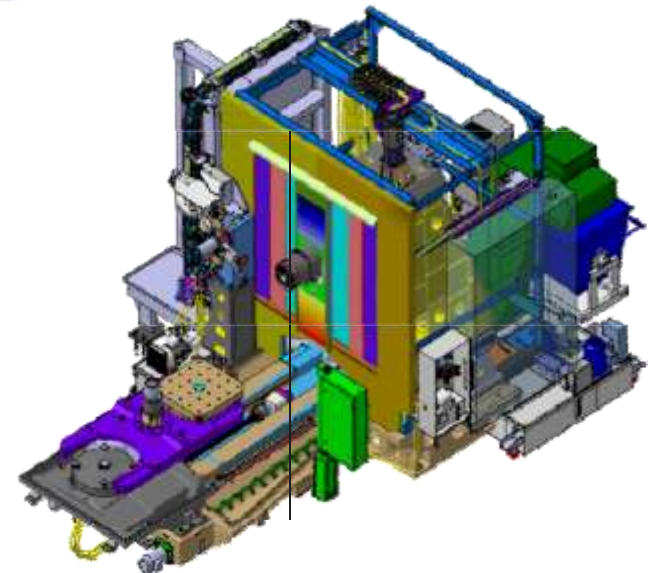
- Front type Æ Rear type

4. Position of ATC

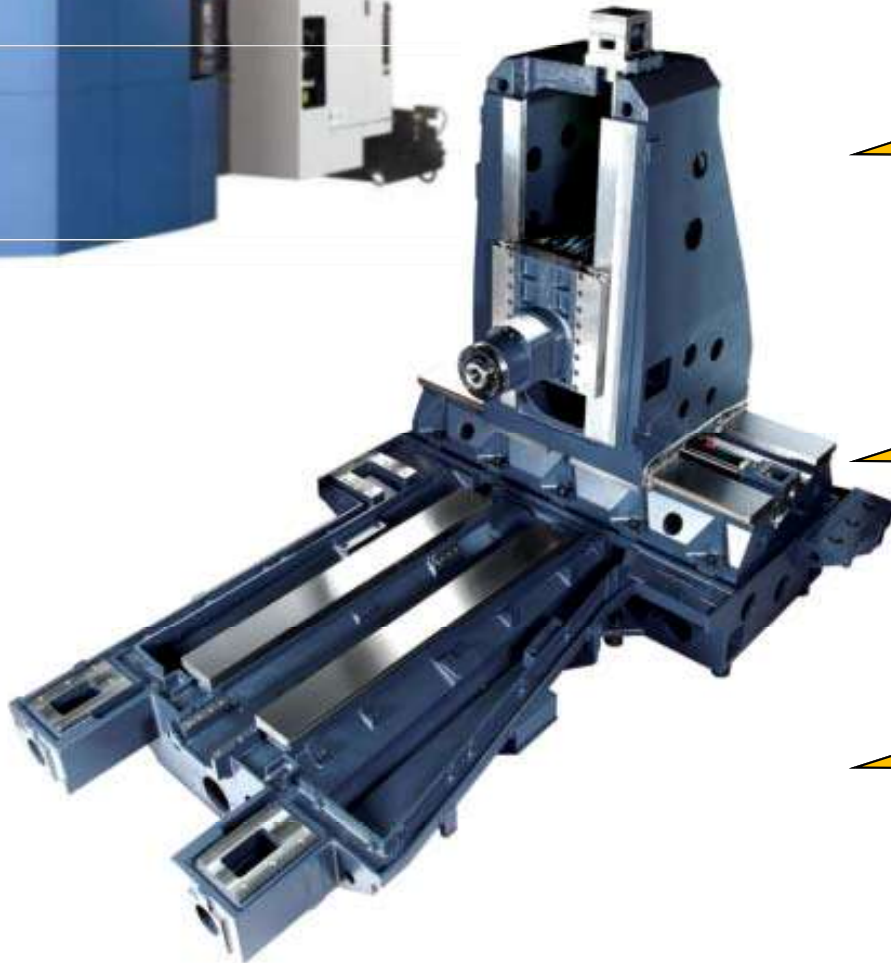
- Upper side of column Æ on the bed

5. Main Operation Panel

- Fixed on electric box Æ Separated swing type



Sales points...



1 Largest Capacity

2 Strongest Performance

3 More Convenience

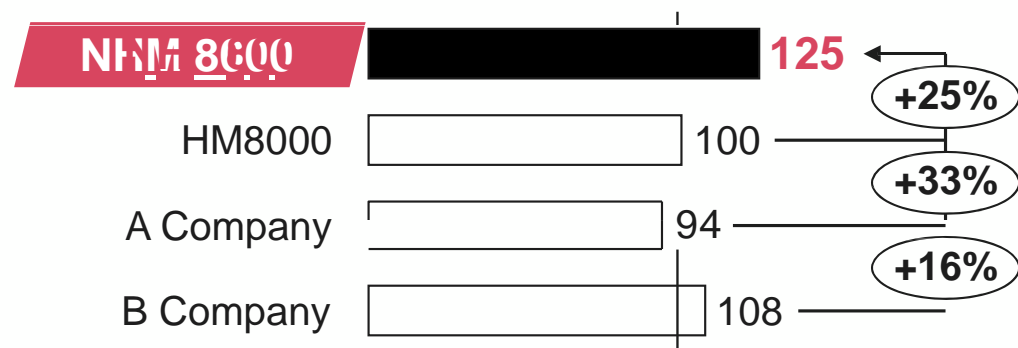
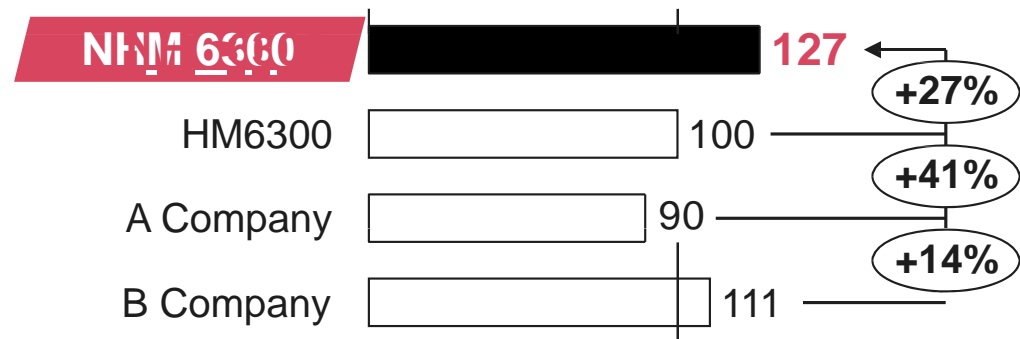
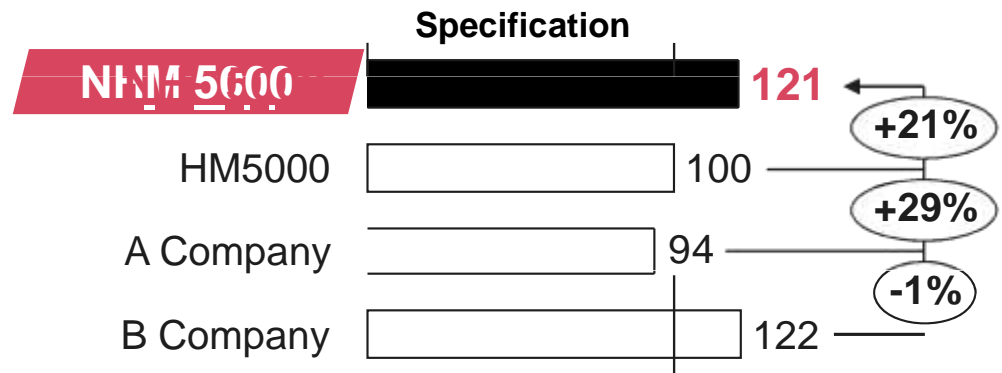
4 Higher Reliability

Sales point: The Largest capacity

The Largest Capacity

World Top Class Specification

- f Axes Stroke
- f Spindle
- f Auto Pallet Changer
- f Auto Tool Changer



Sales point: The Strongest Performance

The Strongest Performance

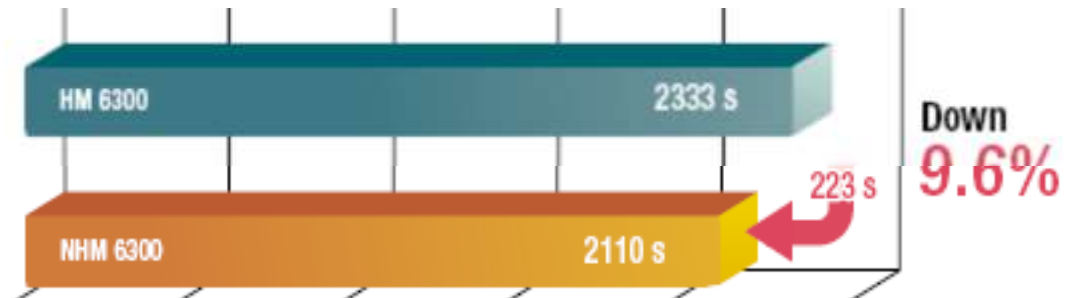
The machining performance of NHM6300 is 10% more productive than HM6300

- **Productivity**

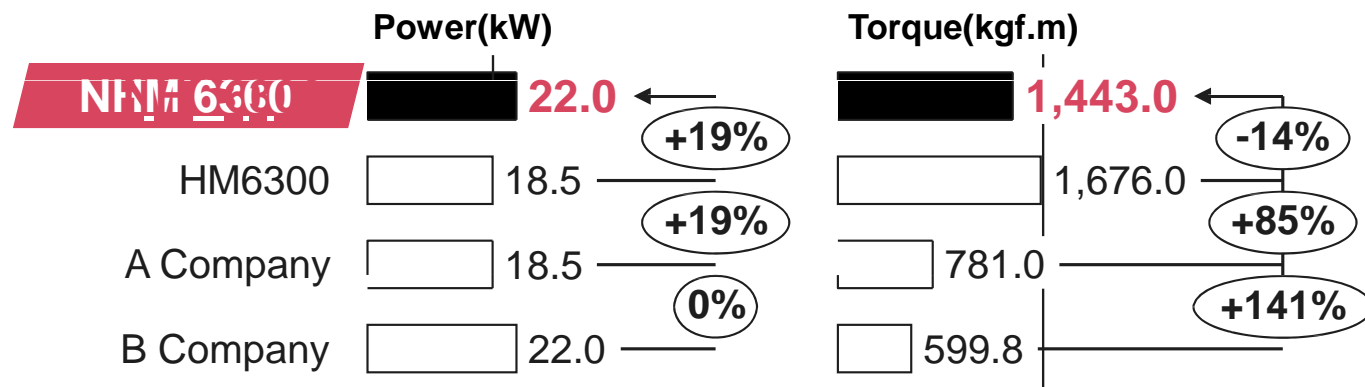
- Automotive part: Carrier middle
- Casting iron
- 21 tools used



- Cycle time(sec.)



- **Spindle Power & Torque**



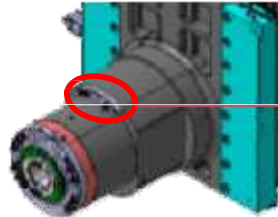
Sales point: The More convenience

More Convenience

- New HMC ATC Screen panel operation

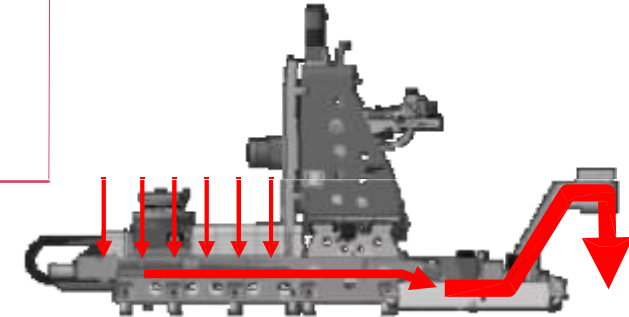


- Machine flushing to remove chip on the spindle



- Semi-permanent Cyclone system filter of T-S-C Unit

- Chip disposal
 - Rear type chip Conveyor adaptive to chip disposal for automatic system
 - Larger coolant tank



- An easy-to-use operation panel
 - Fixed & Swivel
 - Membrain type b



- Oil skimmer
 - Opt. & Std.



- Utility kit in one box



- New H-MC Customize Package I customized to provide user friendly functions and control the magazine for tool and pallet

- Fool plate for safety in working area



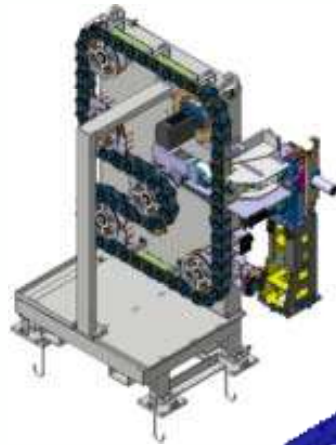
- Door unlocking device



Sales point: The Higher Reliability

Higher Reliability

- Servo driven Tool magazine to reduce ATC time and improve reliability
- Durability test
 - M06 total 600,000 times

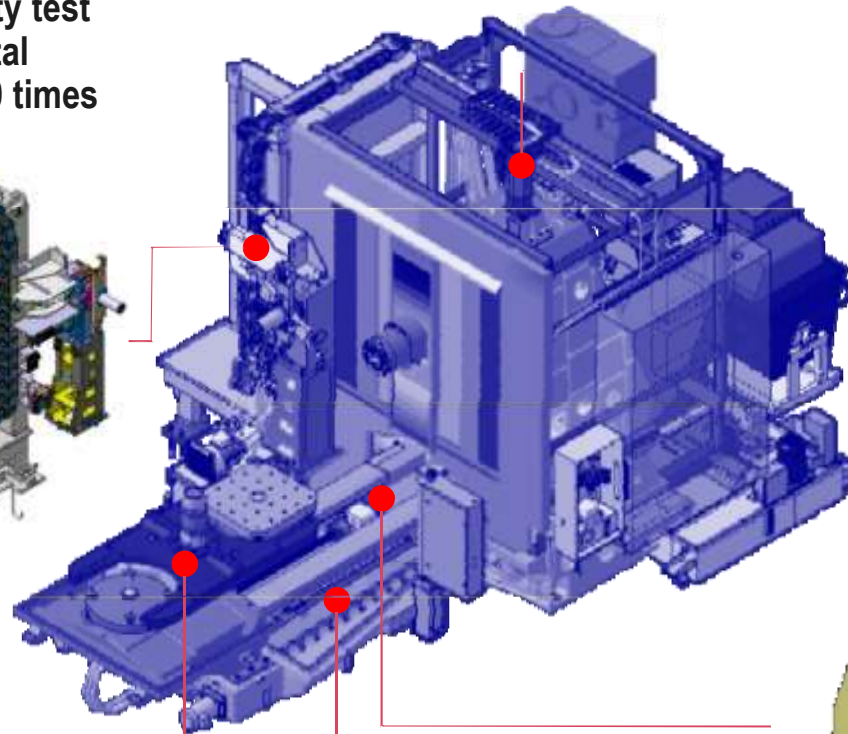
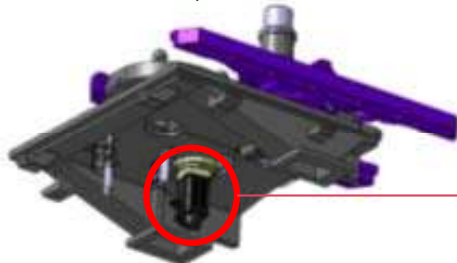


- Common units in NHM and NHP series
 - Spindle, Table, APC, ATC, Tool Magazine, Coolant tank, Total piping

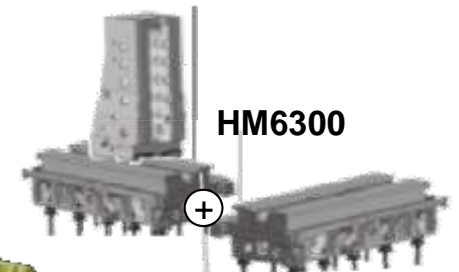
- Cooling fan to reduce Y axis overload



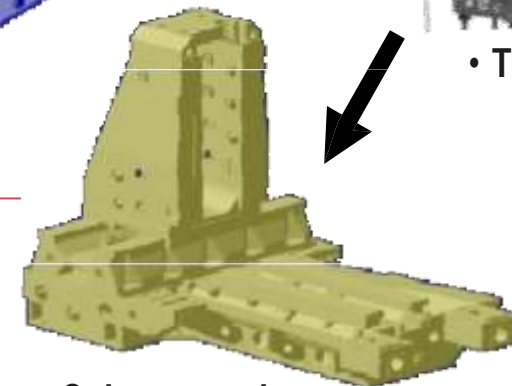
- Servo driven APC to reduce APC time and improve reliability
- Durability test
 - Table: total 120,000 times
 - APC : total 60,000times



- Coolant Leakage Free Bed



- Table moving

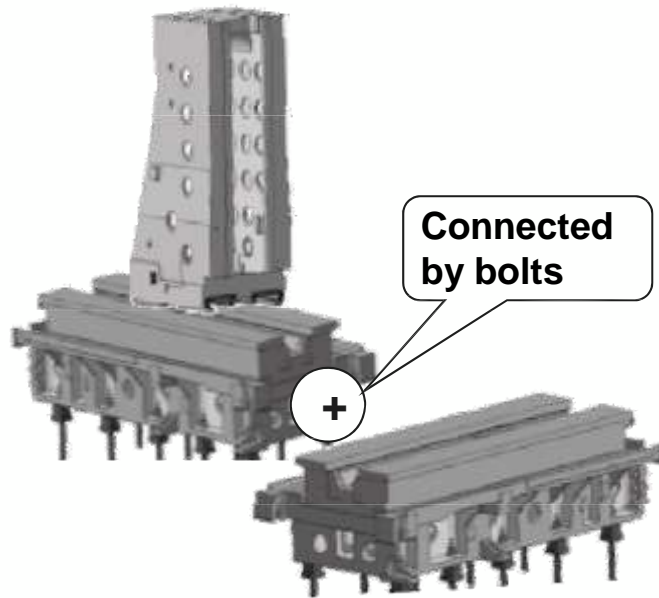


- Column moving
- Stiff bed for table & column in a body
- Column for rigidity

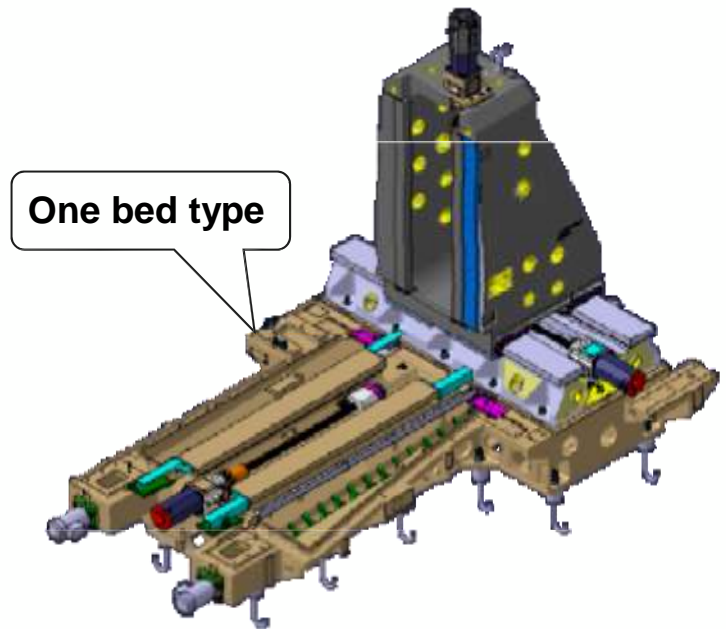
Stiff bed for table & column in a body for High Rigidity

Structure

HM 5000 / 6300 / 8000




NHM 5000 / 6300 / 8000



- < Upgraded stiffness by one body bed
- < Excellent vibration characteristics
- < Perfect chip disposal and powerful coolant device
- < Miracle 100% free coolant bed structure

The extended X / Y / Z axes stroke allow wider work area

Structure

	HM 5000 / 6300 / 8000	NHM 5000 / 6300 / 8000
Larger <u>X / Y / Z axis</u> <u>stroke</u>	HM5000 800 / 650 / 650mm HM6300 1000 / 800 / 850mm HM8000 1250 / 1000 / 1000mm	NHM5000 800 / <u>700</u> / <u>850</u> mm NHM6300 <u>1050</u> / <u>850</u> / <u>1000</u> mm NHM8000 <u>1400</u> / <u>1050</u> / <u>1200</u> mm
<u>X / Y / Z axis</u> <u>Rapid traverse</u> 25% up!!	HM5000 24 / 24 / 24m/min HM6300 24 / 24 / 24m/min HM8000 24 / 24 / 24m/min	NHM5000 <u>30</u> / <u>30</u> / <u>30</u> m/min 25% ↑ NHM6300 <u>30</u> / <u>30</u> / <u>30</u> m/min 25% ↑ NHM8000 24 / 24 / 24m/min
Improved <u>Z-axis</u> <u>continuous</u> <u>thrust force</u>	HM5000 11.5kN HM6300 16kN HM8000 16kN	NHM5000 <u>13.8kN</u> 22% ↑ NHM6300 <u>18.8kN</u> 20% ↑ NHM8000 <u>18.8kN</u> 20% ↑
Larger <u>Bed guide way</u> 	45mm	<u>50mm</u> 10% ↑

Multi Pallet Station [MPS] & Linear Pallet System [LPS]

**Pallet &
Automatic
Pallet
Changer**

NHM 5000 / 6300 / 8000

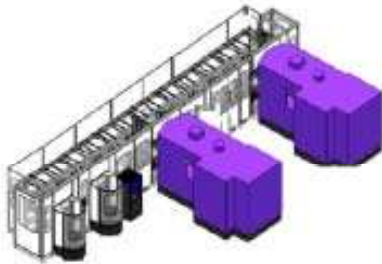
MPS

Multi Pallet Station



LPS

Linear Pallet System



MAIN UNITS

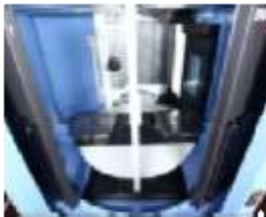
Pallet & Automatic Pallet Changer

High speed servo motor rotary type APC provides high reliability & faster changing time

HM 5000 / 6300 / 8000

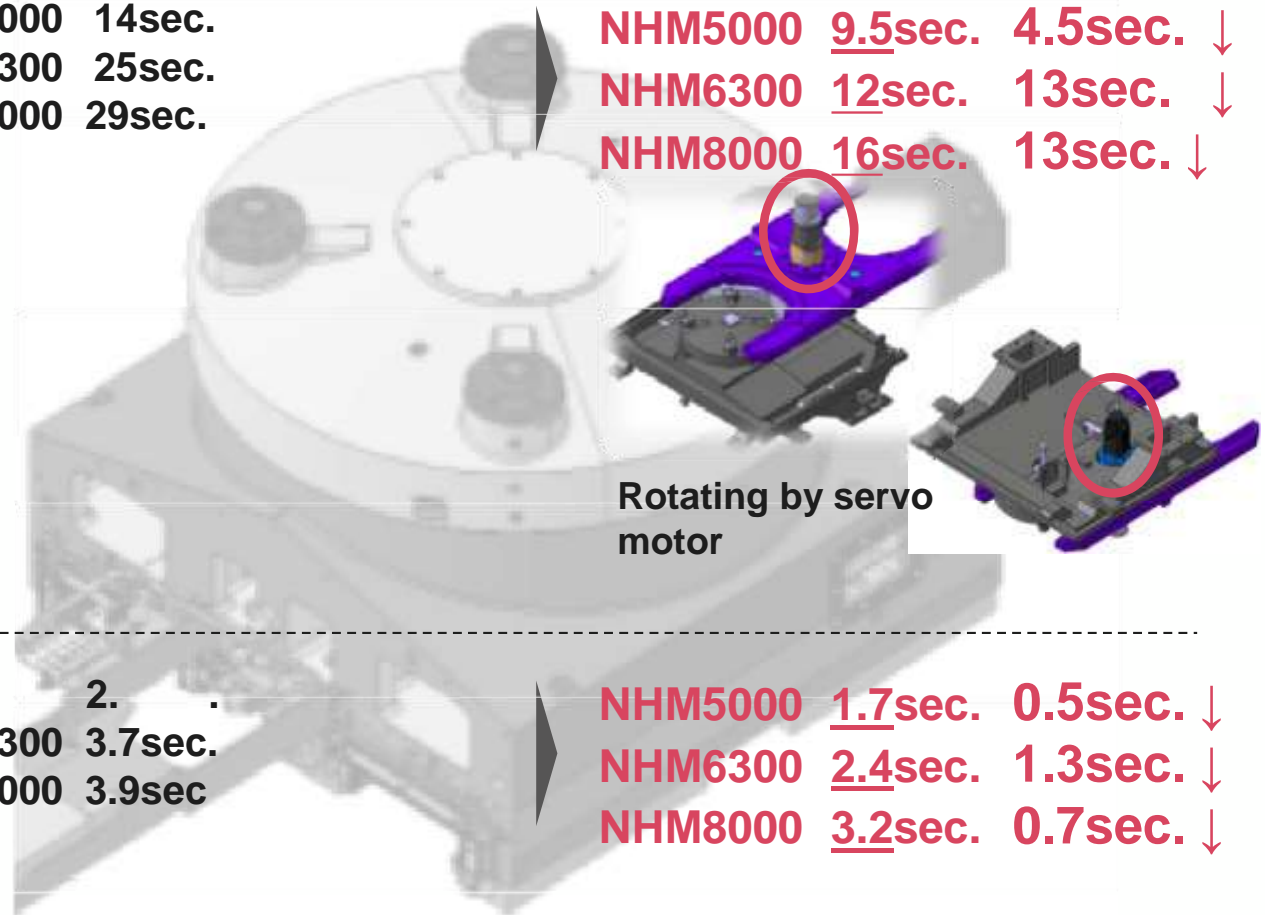
NHM 5000 / 6300 / 8000

Shorter
Pallet
Changer
Time



HM5000 14sec.
HM6300 25sec.
HM8000 29sec.

NHM5000 9.5sec. 4.5sec. ↓
NHM6300 12sec. 13sec. ↓
NHM8000 16sec. 13sec. ↓



Rotating by servo motor

Shorter
Table index time
(0°~90deg.)

HM5 2. .
HM6300 3.7sec.
HM8000 3.9sec

NHM5000 1.7sec. 0.5sec. ↓
NHM6300 2.4sec. 1.3sec. ↓
NHM8000 3.2sec. 0.7sec. ↓

MAIN UNITS

Max. Tool dia. & length are ...

Automatic Tool Changer

Larger Max.
tool dia. &
Longer Max.
tool length



HM 5000 / 6300 / 8000

HM5000 Ø250mm x L400mm

HM6300 Ø250mm x L550mm

HM8000 Ø250mm x L550mm

NHM 5000 / 6300 / 8000

NHM5000 Ø320mm x L530mm
(HSK) x L600mm

NHM6300 Ø320mm x L630mm
(HSK) x L700mm

NHM8000 Ø320mm x L630mm
(HSK) x L700mm

Max. Tool weight
Increased 20%

25kgf

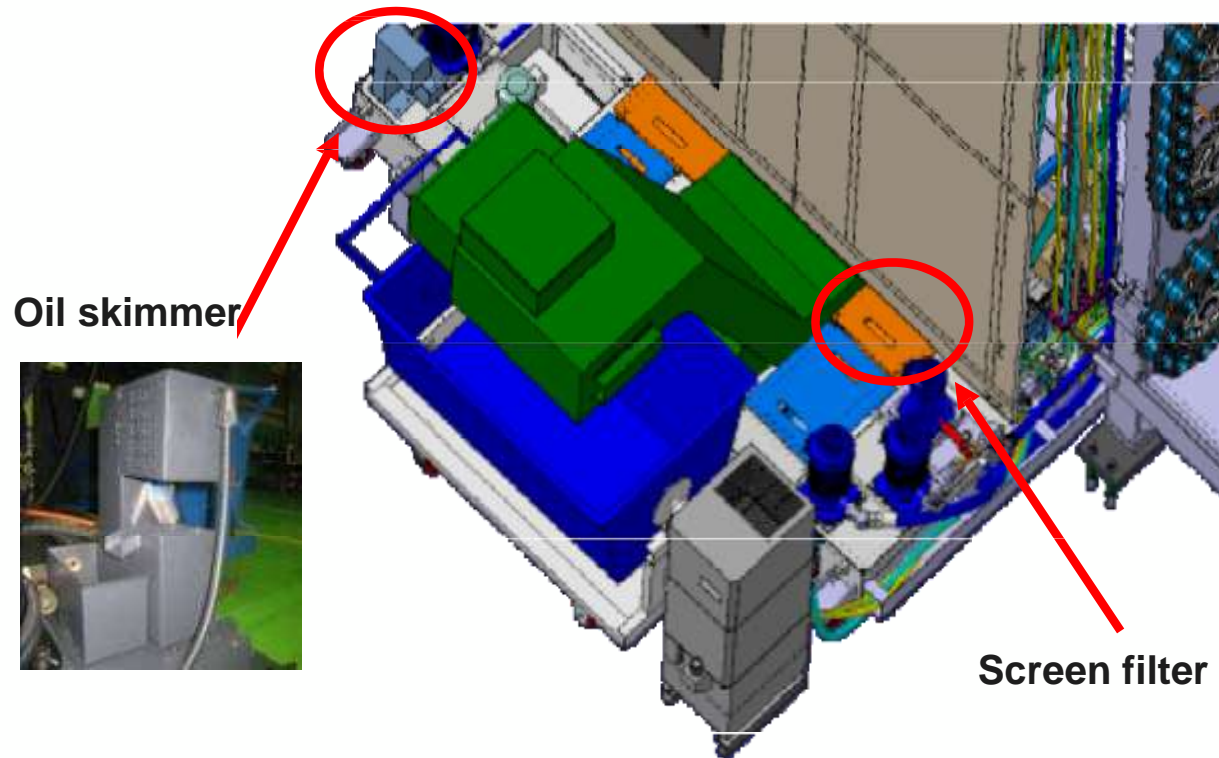


30kgf **5kgf Up**

Coolant & Chip disposal

Easy maintaining for coolant tank & Oil skimmer as standard

NHM 5000 / 6300 / 8000



◁ Available capacity of coolant tank is increased by 40%.

- HM5000	620L ↑	NHM5000	825L
- HM6300/8000	550L ↑	NHM6300/8000	925L

◁ Screen filter can be easily pulled out from tank

Coolant & Chip disposal

Chip disposal is more **fluent**

NHM 5000 / 6300 / 8000



**Internal screw conveyor
dia. Ø120 mm**

◁ Chip disposal capacity is upgraded by increasing diameter of screw conveyor

- HM5000/6300/8000

Dia. 90mm

- **NHM5000/6300/8000 Dia. 120mm**

◁ Strong & wide mono-casting guide for screw conveyor

Coolant & Chip disposal

Machine flushing device is installed for removing cutting chips in machine inside as standard

NHM 5000 / 6300 / 8000

**Flushing for X/Y-axis
slide cover**



**Flushing for Z-axis
slide cover**



Flushing for Bed



MAIN UNITS

CNC

DOOSAN packages have been customized to provide user friendly functions and control the magazine for tool and pallet

NHM /NHP series

Customized
Software
Package
[Fanuc 31iB]



Tool Management
Tool Management II(Opt.)



Tool Management I



Tool Load Monitor(Opt.)



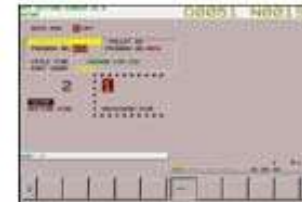
Matrix Magazine(Opt.)



Pallet Magazine
Multi-Pallet Station(Opt.)



APC setting



Pallet Magazine(Opt.)



Operation Rate

ATC/APC Panel

PMC Switch

Help
Easy NC Parameter



Calculator



M code list



G code list

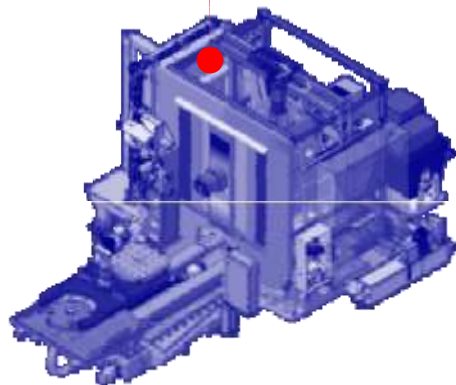


CNC

Add function keys for convenient maintenance and A/S on
Screen panel for ATC

NHM /NHP series

**New HMC
ATC Screen
panel
operation**



Language Selection

Language Selection 2:59 Ver.1.0

DOOSAN Doosan Infracore

한국어 English Italian CE Recover

Home pos Change

Mag.Servo Motor Ref. Position 9:50

Ready OK 준비완료 Execution 완료확인 MANUAL

Waiting Pot No. 1 JOG + JOG -

MANUAL END Prev

Step Recover

Sub-changer Manual Step Operation

MANUAL MAG. CW MAG. CCW

AUTO W-Pot No. 15 Manual Step+ Manual Step-

Recover Wait POT MAG.SIDE Wait POT SPIN. SIDE

복원완료 수동회전 이전 Prev

I/O State

NO USE NO IN USE NO OUT NO IN NO OUT

복원완료 수동회전 이전 Prev 다음 Next

Servo Parameter

NO	30 Tools mag.Parameter	Range	DATA
0	MOTOR POWER CAPA		30
5	MAX POT NO.	2-127	30
6	GEAR RATIO 1MOTOR	1-9999	128
7	GEAR RATIO 2MOTOR	1-9999	12
10	POSITION LOOP P GAIN	0-2048	500
11	VELOCITY LOOP P GAIN	0-2048	100
12	VELOCITY LOOP I GAIN	0-2048	500
30	CURR. LOOP P GAIN	0-2048	1000
39	CURR. LOOP I GAIN	0-2048	1000

Main Screen Manual Operation 이전 Prev

Special Tool

Special Tool Selection 20:32

HEAVY TOOL No.

15	25	150	145	55
0	0	0	0	0

U-Center(SB-axis)/TOOL No.

1	0
---	---

복원완료 ▲

Action Step

ATC Sequence 0:36

MANUAL TOOL CHANGE SEQUENCE:

- 1.TOOL SEARCH FINISH
- 2.SUB-CHANGER POT POSITION
- 3.SUB-CHANGER ARM OUT
- 4.SUB-CHANGER WAITING POT POS.
- 5.SUB-CHANGER ARM IN
- 6.SUB-CHANGER HOME POSITION
- 7.WAITING POT SPINDLE SIDE
- 8.X,Y,Z-Axis 2nd Reference return
- 9.SPINDLE ORIENTATION(M19)
- 10.ATC DOOR OPERATION CNC Custom Screen)
- 11.ATC 1CYCLE(on CNC Custom Screen)

복원완료 수동회전 이전 Prev 다음 Next

Macro Program

Program(O9001) 0:41

```

O9001(TOOL CHANGE)
(G37)
G40G49G80 IF[#100EQ1]GOTO100
M222
F[#3010EQ1]GOTO500 G31G30X.Y.Z:M13:
#109=0
G04 N100M4T
#105=#4003 G[#105]
M46 N500
G01 M99
          
```

복원완료 수동회전 이전 Prev 다음 Next

Counter

Counter(M06&M60) 0:45

Tool Changer 12345678

Pallet Changer 12345678

복원완료 수동회전 이전 Prev

NHM 5000

NHM5000 VS. HM5000

Specification			Doosan				WIA			TOYADA		
		Unit	NHM5000	121	HM5000	100	KH500(KH50G)	94	FH550R	122		
Axes system	X-Axis	mm	800	100	800	100	760	95	750	94	137	
	Y-Axis	mm	700	108	650	100	705	108	800	123		
	Z-Axis	mm	850	131	650	100	650	100	850	131		
	Rapid Traverse (X/Y/Z)	m/min	30/30/30 (36/36/36)	125	24/24/24	100	24/24/24	100	48/48/48	200		
APC	Max. workpiece size (Dia. x Height)	mm	Ø850x 1100	141	Ø800x800	100	Ø900x780	123	Ø850 x1168	165	137	
	Max. allowed weight	kgf	800	100	800	100	800	100	800	100		
	Pallet change time	sec	9.5	147	14	100	18	78	9.5	147		
Spindle	Speed	r/min	6,000 (8,000/10000)	100	6,000 (8,000)	100	4500(8000)	75	6,000 (15,000)	100	112	
	Power (Cont./Intermittent)	kW	15/18.5 (18.5/22, 22/35)	100	15/18.5 (18.5/22)	100	15/18.5	100	22/30 (25/30)	162		
	Max. Torque(30min)	Kgf.m	954(1134/1444)	117	813.4(999.6)	100	781(922.2)	96	600 (262.6)	74		
ATC	Tool storage capacity	EA	60 (90/120/150/ -376)	150	40 (60/90/120/Matrix)	100	40(60/90/120)	100	40 (60/120/132-326)	100	103	
	Max. tool diameter	mm	130/320	128	130/250	100	110/245	98	120/266	106		
	Max. tool length	mm	530	133	400	100	400	100	470	118		
	Max. tool weight	kgf	30	120	25	100	20	80	27	108		
	Tool change time (T-T-T)	sec	2.0/3.5	125	2.5	100	5.5	45	3	83		
Guide way			BOX		BOX		BOX		BOX			

() : Optional



NHM 6300

NHM6300 specification comparison

Specification			Doosan				WIA			TOYODA			TOYODA					
		Unit	NHM6300		127	HM6300		100	KH630(KH63G)		90	FH630R		111	FH630SX		FA630S	
Axes system	X-Axis	mm	1,050	105	113	1,000	100	100	950	95	97	1,000	100	125	1,000	1,000		
	Y-Axis	mm	850	106		800	100		825	103		800	100		800	850		
	Z-Axis	mm	1,000	118		850	100		760	89		850	100		850	750		
	Rapid Traverse (X/Y/Z)	m/min	30/30/30 (36/36/36)	125		24/24/24	100		24/24/24	100		48/48/48	200		60/60/60	36/36/36		
APC	Max. workpiece size (Dia. x Height)	mm	Ø1,050 x 1,350	149	152	Ø1,000 x 1,000	100	100	Ø1,120 x 880	110	111	Ø1,000 x 950	95	129	Ø1,000 x 1,000	Ø1,000 x 1,000		
	Max. allowed weight	kgf	1,200	100		1,200	100		1,000	83		1,000 (1,200)	83		1000	1300		
	Pallet change time	sec	12	208		25	100		18	139		12	208		12	12		
Spindle	Speed	r/min	6,000 (8,000/10,000)	100	115	6,000 (8,000)	100	100	4,500 (8,000)	75	74	6,000 (15,000)	100	79	6000(15000)	6,000 [15,000]		
	Power (Cont./Intermittent)	kW	35/22 (30/22, 37/30)	159		22/18.5 (26/22)	100		22/18.5 (26/22)	100		22 (30)	100		3-0/22	30/22		
	Max. Torque(30min)	Kgf.m	1444 (1991)	86		1,676 (1,989)	100		781 (922)	47		599.8 (262.6)	36		-	-		
ATC	Tool storage capacity	EA	60 (90/120/150/ 196/256/316/376)	150	128	40 (60/90/120/196)	100	100	40 (60/90/120)	61	79	40 (60/120/132-326)	166	110	40(60、121、190Or more)	60(120、190(FA630S Only)		
	Max. tool diameter	mm	130/320	128		130/250	100		110/245	98		120/266	106		120	120		
	Max. tool length	mm	630	115		550	100		600	109		470	85		545	500		
	Max. tool weight	kgf	30	120		25	100		20	80		27	108		27	27		
	Tool change time (T-T-T)	sec	2.0/3.5	125		2.5	100		5.5	45		3	83		2.4-2.7	2		
Guide way			BOX				BOX				BOX				Roller		BOX	

() : Optional

SPECIFICATION

NHM 8000

NHM8000 VS. HM8000

Specification			Doosan						WIA			TOYODA		
		Unit	NHM8000		125	HM8000		100	KH80G		94	FA800		105
Axes system	X-Axis	mm	1,400	112	109	1,250	100	100	1250	100	90	1,350	108	135
	Y-Axis	mm	1050	105		1000	100		1000	100		1150	115	
	Z-Axis	mm	1,200	120		1000	100		850	85		1150	115	
	Rapid Traverse (X/Y/Z)	m/min	24/24/24 (30/30/30)	100		24/24/24	100		18/18/18	75		24/24/24	200	
APC	Max. workpiece size (Dia. x Height)	mm	Ø1,450x 1,550	158	155	Ø1,310 x 1,200	100	100	Ø1,150 x1150	74	105	Ø1,300 x1300	95	92
	Max. allowed weight	kgf	2,000	125		1,600	100		2,200	138		2500	83	
	Pallet change time	sec	16	181		29	100		28	104		30	97	
Spindle	Speed	r/min	6,000 (8,000 / 10,000)	100	115	6,000 (8,000)	100	100	4,500	75	87	6,000 (14000/ 15,000)	100	79
	Power (Cont./Intermittent)	kW	22/35 (30/37)	159		18.5/22 (22/26)	100		22/26	119		22/30	100	
	Max. Torque(30min)	Kgf.m	1,443 (1991)	86		1,676 (1,989)	100		1109.5	66		600 (166.7/ 350.2)	36	
ATC	Tool storage capacity	EA	60 (90/120/150/ Matrix)	150	123	40 (60/90/120/196~324)	100	100	40 (80/120)	100	95	40 (up to 240)	100	114
	Max. tool diameter	mm	130/320	128		130/250	100		130/260	104		120/266	106	
	Max. tool length	mm	630	115		550	100		500	91		550	100	
	Max. tool weight	kgf	30	120		25	100		27	108		35	140	
	Tool change time (T-T-T)	sec	2.0/3.5	100		2.5	100		3.5	71		2	125	
Guide way			BOX			BOX			BOX			BOX		

() : Optional

HM1000, HM1250 - OVER VIEW

HMC for large heavy duty cutting



Major specification

- Stroke [X/Y/Z] : 2100/1500/1500 mm
- Rapid Traverse [X/Y/Z] : 24/24/24 m/min
- Spindle : 6,000 rpm(8,000 rpm)
- Allowable load : 3,000 kgf
- Max Workpiece Size : Φ 2,000x1,725 mm

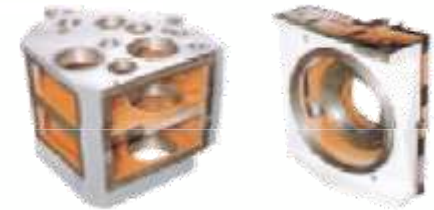


Application area

- Shipbuilding parts, Construction equipment
- Industrial machinery and equipment, Aerospace
- Hard-to-Cut Material

Typical workpiece

- Gear box
- Middle size casting
- Aerospace parts



Main features

- Rigid box guide way
- Maximum Spindle torque the same level.
- Magazine application by servo motor driven
- Shaft cooling device of ball-screw is option.

Main competitor

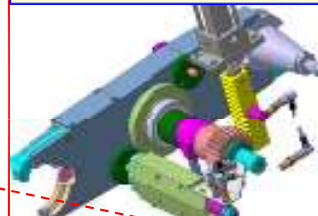
- Hyundai-WIA, Mori-seiki

HM1000, HM1250 - Major unit & sales point

Servo Driven Magazine



New concept Auto Tool Changer

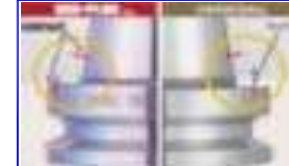


High speed & rigid Spindle



- Max SPD RPM: 8000rpm(OPT)
- General spindle motor with 3step Gear BOX
- Unexpected High torque in Low speed

Bigplus type dual contact Tool (STD)



- Increase cutting accuracy by minimize tool vibration

Magazine Operating by Touch Screen



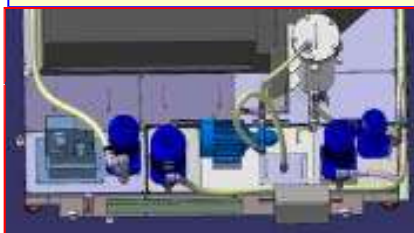
1. High-speed revolution Magazine: Max 0.9sec./pot
2. Acc. time decrease
3. removal Pot-counter error
4. Revolutionary decrease of the noise and a shock.
5. Easy maintenance

•Oil Cooler (STD)



- SPINDLE Cooling SYSTEM
- Minimize SPD Thermal deformation

Coolant flushing device for X-axis BED & Coolant tank

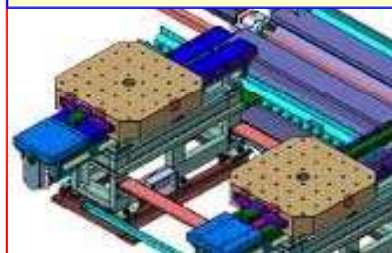


“DBD” type Ball screw bearing structure



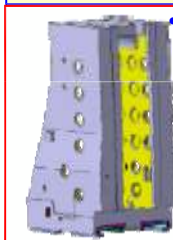
BRG Lifetime 3 times increase

Rigid APC (2-APC)



**•High rigid
•Box Guide**

- Rigid box guide way type, which quarantines high accuracy & heavy-duty cutting capability.



Shaft cooling device for Ball Screw (opt.)



HM1000, HM1250 - Specification

Specification			Unit	HM1000	HM1250	
					AS-IS	TO-BE
Stroke	X-axis	mm	2,100	2,100	←	
	Y-axis	mm	1,250	1,500	←	
	Z-axis	mm	1,250	1,500	←	
Rapid Traverse	X-axis	m/mm	24	24	←	
	Y-axis	m/mm	24	24	←	
	Z-axis	m/mm	24	24	←	
Spindle nose to table center			mm	250 ~ 1,500	285 ~ 1,785	←
Spindle center to pallet top			mm	75 ~ 1,325	50 ~ 1,550	←
Table	Pallet size	Standard	mm	1,000 x 1,000	1,250 x 1,250	←
		Option - 1	mm	1,250 x 1,000	1,250 x 1,000	←
		Option - 2	mm		1,000 x 1,000	←
	Pallet loading capacity		kg	3,000	3,000	←
	Max. B-axis rotating speed		rpm	5	3	←
	Max. workpiece size (Dia. x Height)		mm	Ø2000 x h1474	Ø2000 x h1725	Ø2300 x h1725
Remarks						From Aug. 2011